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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,457	03/01/2004	Adam R. Pawloski	H1559	9956
45305	7590	11/09/2006		
RENNER, OTTO, BOISSELLE & SKLAR, LLP (AMDS) 1621 EUCLID AVE - 19TH FLOOR CLEVELAND, OH 44115-2191			EXAMINER SULLIVAN, CALEEN O	
			ART UNIT	PAPER NUMBER
			1756	

DATE MAILED: 11/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/790,457

Applicant(s)

PAWLOSKI ET AL.

Examiner

Caleen O. Sullivan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
- Paper No(s)/Mail Date 03/24/04.

- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: Reference No 414a and 414b of Figure 4 are described in the specification in a manner that is inconsistent with their designation in the drawings. (See pages 13-14). It appears the two designations are reversed. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1-6 and 9-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Rolland ('832).

Rolland ('832) discloses an immersion lithography method performed on a photoresist layer of a substrate, where an immersion lithography medium is applied over the photoresist layer, which is then imaged through the immersion layer, and then the immersion layer is removed from the photoresist layer. (See, col. 2, 25-67). The substrate over which the photoresist layer is applied is a semiconductor wafer (See, col.4, 33-35), and the immersion lithography medium is removed by applying supercritical CO₂ to the surface of the wafer. (See, col.6, 30-37). These teachings meet the limitations of claims 1, 6, 9-10, and 13. Rolland ('832) further discloses that the immersion fluid layer can be irradiated at a wavelength of 157nm, which is recited in claims 5 and 10 and is within the range recited in claim 4. (See. col. 7, 17-20).

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Rolland ('832) also discloses the immersion fluid can be selected from compounds including perfluoropolymers and other fluorinated compounds, as recited in claims 2 and 11. (See, col.6, 48-57). Rolland ('832) also discloses the immersion fluid compound should be transparent, and should not interact with the photoresist as recited in claims 3 and 12. (See. col. 6, 60-66).

Rolland ('832) teaches every limitation of claims 1-6 and 9-13.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. Claims 7-8 and 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rolland ('832) in view of Costantini ('317).

Rolland ('832) is relied upon as discussed in the rejection of claims 1-6 and 9-13 under 35 USC 102 (e) set forth above in paragraph 3. Claim 17 recites the same limitations as claims 2 and 11. Claim 18 recites the same limitations as claims 6 and 13. They are rejected for the same reasons as stated above.

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Rolland ('832) fails to disclose a step in the immersion lithography method where after supercritical CO₂ is applied to the surface of the wafer a mixture of immersion lithography medium and supercritical CO₂ is removed and the immersion lithography medium is recovered by reducing the temperature or pressure of the mixture to remove CO₂ from the mixture as recited in claims 7-8 and 14-19. Moreover, Rolland ('832) fails to disclose that the recovered immersion lithography medium will exhibit the same chemical composition or the same purity as the lithography medium applied to the surface of the wafer as recited in claim 20. However, these limitations are taught by the disclosures of Costantini ('317).

Costantini ('317) discloses a supercritical fluid delivery and recovery system for semiconductor wafer processing. (See, col. 2, 7-11). In this method there is a recovery section (See, col. 3, 24-31) that takes in a solvent, which is a mixture of immersion fluid and supercritical CO₂, referred to as effluent, obtained from a semiconductor processing chamber. (See, col.6, 6-18). This disclosure teaches the limitations of claims 7, 14 and 16. In the recovery section the effluent passes into a separator where pressure and temperature fall below the critical points and the effluent separates into a vapor phase and a liquid phase. (See, col.6, 21-25). This disclosure teaches the limitations of claims 8, 15 and 19. The vapor phase contains the gas or gas mixture originally supplied into the feed portion of the system. The liquid phase contains the solvent and any other suspended components still remaining, and it is passed into a separator and heated to its boiling point. Then the solvent is separated as a vapor back to a suitable purity to be reused in the semiconductor wafer process chamber. (See, col. 6, 29-56). Although, Costantini ('317) does not specify a purity for the recovered immersion fluid, it is inherent that "suitable for re-use" means the recovered fluid would exhibit the same chemical composition or purity as the immersion fluid applied to the surface of the wafer as recited in claim 20.

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It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to modify the teachings of Rolland ('832) with the teachings of Costantini ('317), in order to recover the immersion lithography medium that is removed by applying supercritical CO₂ to the wafer, because Costantini ('317) teaches one would be able to recycle the immersion lithography medium that is recovered back to the semiconductor wafer processing chamber for re-use, resulting in a more economically efficient semiconductor wafer processing method.

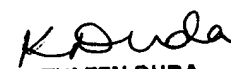
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caeleen O. Sullivan whose telephone number is 571-272-6569. The examiner can normally be reached Monday-Friday, 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

COS
11-02-06


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